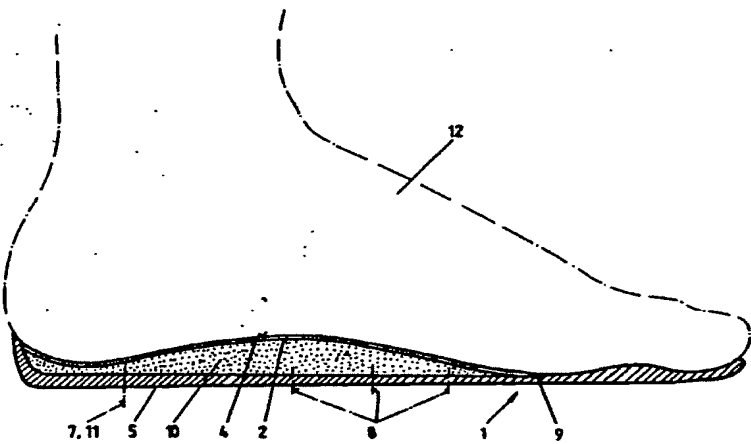


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<p>(21) International Application Number: PCT/EP93/02801 (22) International Filing Date: 12 October 1993 (12.10.93) (30) Priority data: VE92U000029 15 October 1992 (15.10.92) IT (71) Applicant (for all designated States except US): HTM SPORT S.P.A. [IT/IT]; Devision Skiboot & Trekking, Via Nome di Maria, 1a, I-31010 Maser (IT). (72) Inventor; and (75) Inventor/Applicant (for US only): PRANDINA, Enzo [IT/IT]; Via Foresto Vecchio n.11, I-Asolo (IT). (74) Agent: SZASZ, Tibor; Tyroliaplatz 1, A-2320 Schwechat (AT).</p>		<p>(81) Designated States: JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.</p>
<p>(54) Title: ANATOMICAL FOOT-BED AND A PROCEDURE FOR ITS ASSEMBLY</p> <p>(57) Abstract</p> <p>This invention concerns an anatomical foot-bed, in particular for foot-wear for skis and a procedure for its assembly. Anatomical foot-beds are known comprising two thin sheets of a flexible material, for example leather, plastic, fabric, etc., bound together along the edges to form a space filled with a polyhydric alcohol and an isocyanate separated by a thin membrane. Since the two sheets have been obtained from flat layers and joined together, such known foot-beds, however, have the drawback that they do not adapt perfectly to the foot, especially in the heel region and the foot arch region, as the joint prevents the same sheets from adapting. According to the invention all these drawbacks are eliminated therein that a rigid preformed inner sole (1) to the top of which an impermeable membrane (2) is applied delimiting a space (3) accessible from the outside for the introduction of hardening material.</p> 		

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Anatomical foot-bed and a procedure for its assembly

This invention concerns an anatomical foot-bed, in particular for footwear for skis and a procedure for its assembly.

Anatomical foot-beds are known comprising two thin sheets of a flexible material, for example leather, plaxtic, fabric, etc., bound together along the edges to form a space filled with a polyhydric alcohol and an isocyanate separated by a thin membrane.

At the moment of use the memrane is broken, causing the two components to be mixed so as to form a homogeneous mixture and, after having introduced the footbed inside the article of footwear, the foot is introduced and rests on the foot-bed until the mixture solidifies.

Since thw two sheets have been obtained from flat layers and joined together, such known foot-beds, however, have the drawback that they do not adapt perfectly to the foot, especially in the heel region and the foot arch region, as the joint prevents the same sheets from adapting.

Other foot-beds are known which are obtained by modelling standard plates made in materials containing several components or by hot deformation of these plates. However, such known foot-beds also present other drawbacks and in particular:

- they require special equipment for their preparation;
- they must be adapted by hand, following the modelling stage, as the articles of footwear vary in surface area in relation to the area where the foot rests, according to the manufacturer;
- they are not completely reliable in that they are made outside the article of footwear, i.e. in an ambient free from restrictions.

According to the invention all these drawbacks and shortcomings are eliminated with an anatomical foot-bed in particular for footwear for skis, as described in claim 1.

- 2 -

This invention is described in more detail hereunder with reference to the attached table of drawings in which: figure 1 is a prospective view of an anatomical foot-bed according to the invention, figure 2 is a view of the cross section 11-11 of fig,1; and figure 3 is a view of the longitudinal section.

As can be seen from the figures, the anatomical foot-bed according to the invention comprises a pre-formed inner sole 1 made preferably in polyethylene, to the top of which an impermeable membrane 2 is attached which forms a cavity 3 with the inner sole 1 and which is covered by a hygienic cover 4. Also the pre-formed inner sole is covered on the bottom by a hygienic cover 5..

The pre-formed inner sole has a light restraining border 6 in the region of the foot arch and the heel.

The pre-formed inner sole is provided with a hole 7, which connects the outside and the cavity 3 formed by the pre-formed inner sole 1 and the membrane 2.

In addition the pre-formed inner sole is provided in its bottom surface with several small holes 8, preferably a number between 3 and 20, with a diameter between 0,5 and 2 mm, preferably 1,25 mm, the function of which will be explained hereinafter.

Lastly, the pre-formed inner sole is provided, in the region where the front part of the foot presses, with transverse stitching 9 which joins the top surface of the inner sole to the impermeable membrane 2.

Preparation of the foot-bed according to the invention is carried out as follows:

At the moment of use, a self-hardening substance, e.g. silicon 10, is introduced using special equipment through hole 7 and subsequently the hole is closed by means of self-adhesive plug 11.

In other cases a polyhydric alcohol and an isocyanate can be used as the self-hardening substance.

The foot-bed is then inserted into the article of footwear and the foot 12 is introduced on top of this to

model it according to the anatomical form of the foot until the material solidifies.

The amount of material to be injected into every single foot-bed, related to the different sizes, or groups of sizes of ski boots, comes to the values shown in the attached table.

TABLE

During the introduction of the foot into the article of footwear, the user adopts the position most suitable to leave the foot in a neutral state, i.e. not completely without load, but at the same time not loaded by the weight of the body. The best situation is preferably for the user to be seated.

At this stage, any air inside the cavity 3 can escape through holes 8, and the stitching 9 has the function of stopping the silicon from sprading towards the front area of the inner sole, so as to prevent the formation of ridges due to silicon accumulating in the spaces between the toes, ridges which with time may be uncomfortable for the user.

Once the desired shape has been reached, the foot is removed from the article of footwear and a certain period (5-10 minutes) is allowed to pass for the hardening stage to be fully completed.

Once the hardening stage has been completed, the silicon has a hardness between 30 and 40 Shore D.

From what has been said, it is clear that the anatomical foot-pad according to the invention offers numerous advantages and in particular:

- the foot rests evenly on the foot-bed, thanks to the silicon filling the pre-existing spaces between the anatomical foot-bed and the foot of the user;
- a high degree of comfort is provided as the foot-bed is shaped in the ambient in which it is used, and that is, inside the shell.

CLAIMS

1. Anatomical foot-bed in particular for footwear for skis, comprising a rigid preformed inner sole (1) to the top of which an impermeable membrane (2) is applied delimiting a space (3) accessible from the outside for the introduction of hardening material.
2. Foot-bed according to claim 1 wherein: the foot-bed comprises a hygienic cover (4) applied on top to the impermeable membrane (2).
3. Foot-bed according to claim 1 wherein: the hardening material comprises silicon and a catalyst.
4. Foot-bed according to claim 1 wherein: the hardening material comprises a polyhydric acid and an isocyanate.
5. Foot-bed according to claim 3 and 4 wherein the hardening material at the end of the hardening stage has a hardness of 30-40 Shore D.
6. Foot-bed according to claims from 1 to 5 wherein: the space (3) formed by the inner sole (1) and the impermeable membrane (2) is accessible from the outside by means of a hole (7), which can be closed by means of a plug (11).
7. Foot-bed according to claim 1 wherein: the pre-formed inner sole (1) has a retaining border (6) at least in the heel and foot arch regions.
8. Foot-bed according to claim 1 wherein: the foot-bed comprises several holes (8) for air to escape.
9. Foot-bed according to claim 8 wherein: the foot-bed comprises from 3 to 20 holes, preferably 16, with a diameter between 0,5 and 2 mm, preferably of 1,25 mm.
10. Foot-bed according to claim 1 wherein: the upper surface of the inner sole is transversally bound to the overlying impermeable membrane at the front end.
11. Foot-bed according to claim 10 wherein: the inner sole comprises in the front area, transversal stitching (9) which connects the upper surface of the inner sole to the impermeable membrane (2).
12. Procedure for assembly of an anatomical foot-bed, in particular for footwear for skis, according to claim 1 to 11

comprising a rigid pre-formed inner sole (1) to the top of which an impermeable membrane (2) is applied delimiting a space (3) accessible from the outside for the introduction of hardening material characterized by the fact that:

- at least one aperture (7) is made on said foot-bed in its bottom surface,
- the hardening material is inserted into said space,
- said aperture is closed,
- the foot-bed is inserted inside the article of footwear,
- the foot is introduced into the article of footwear,
- time is given for the hardening material to solidify,
- the foot is removed from the article of footwear.

Fig.1

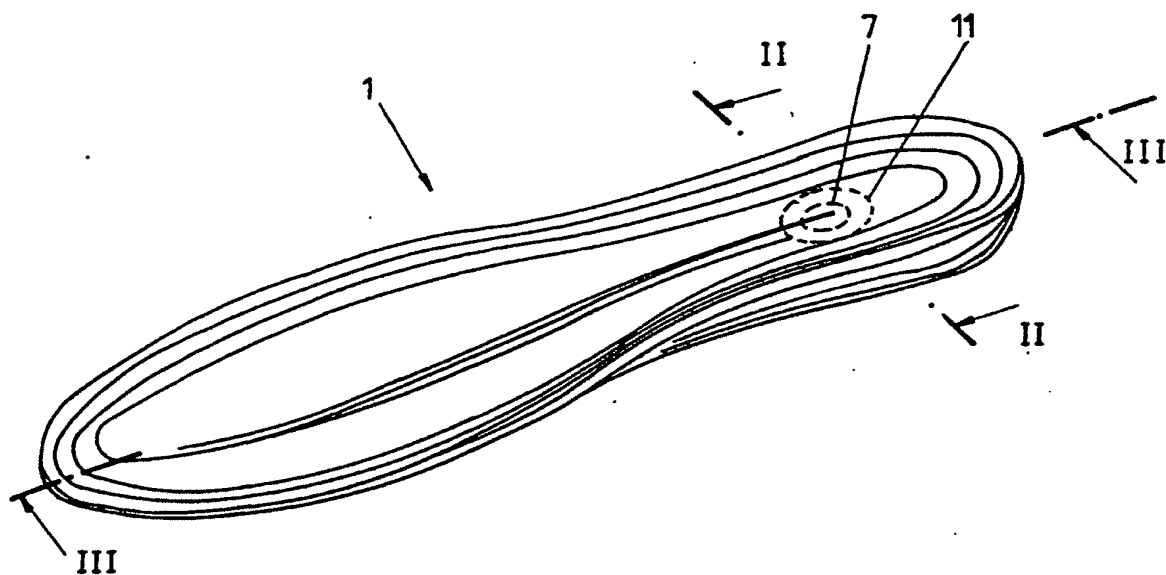


Fig. 2

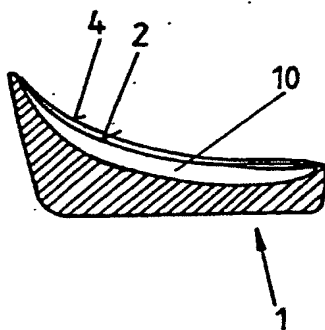
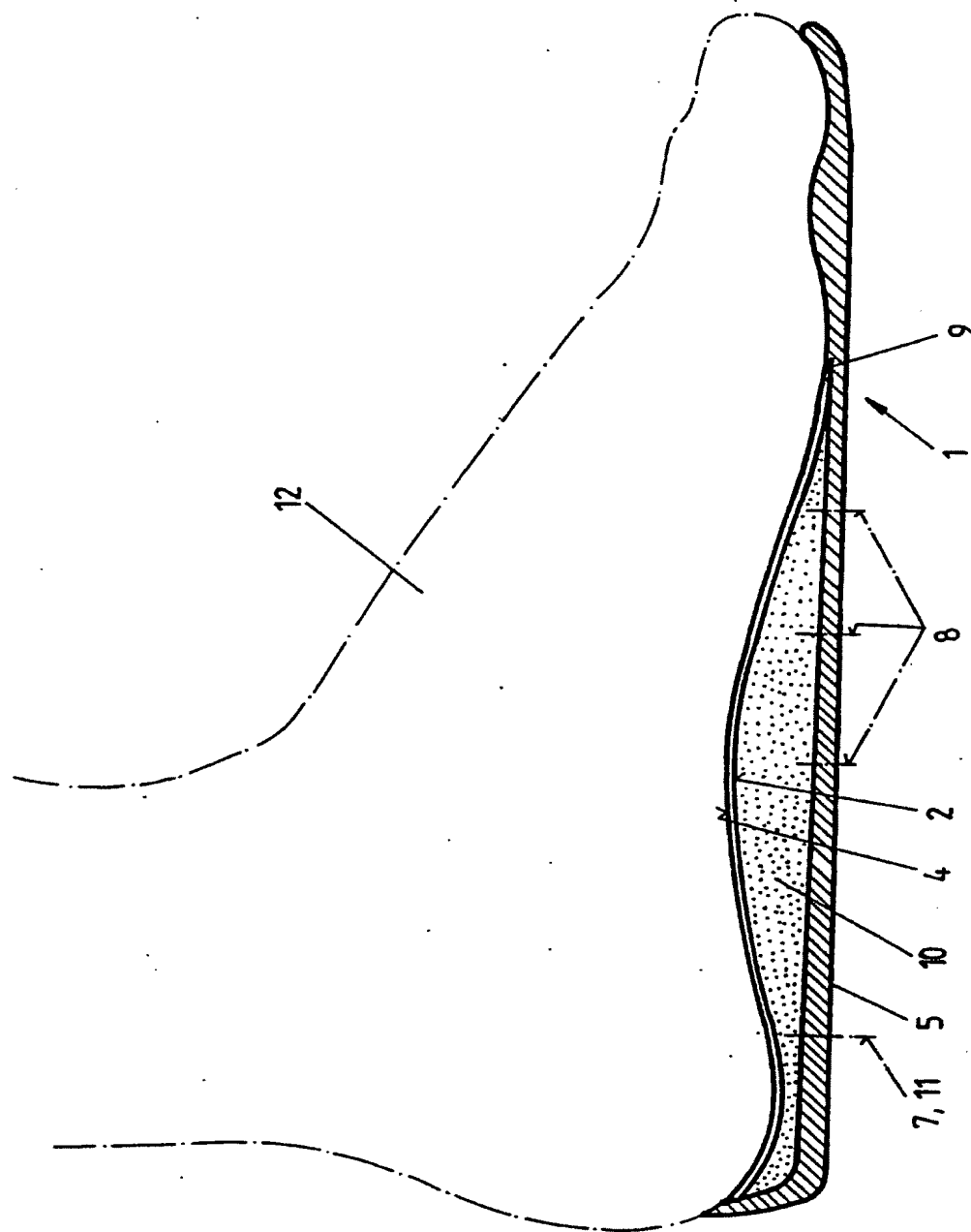


Fig.3



INTERNATIONAL SEARCH REPORT

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

International Application No
PCT/EP 93/02801

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